IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Baggett et al.	Art Unit	: 2166
Serial No.	: 09/431,366	Examiner	: Khanh Pham
Filed	: November 1, 1999	Conf. No.	: 8583
Title	: METHOD AND APPARATUS FOR PROVIDING AVAILABILITY OF AIRLINE SEATS		

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF ON BEHALF OF DAVID BAGGETT ET AL.

The Appeal Brief fee was previously paid. Please apply any other charges or credits to Deposit Account No. 06-1050.

(i.) Real Party In Interest

The real party in interest in the above application is ITA Software, Inc.

(ii.) Related Appeals and Interferences

The appellant is not aware of any appeals or interferences related to the above-identified patent application.

(iii.) Status of Claims

The claims have been twice rejected. Claims 1-32, all of the claims in the application are the subject of this appeal.

(iv.) Status of Amendments

All amendments have been entered. Appellant originally filed a Notice of Appeal on March 24, 2006. Appellant filed two Appeal Briefs, the last one a corrected brief was filed on October 13, 2006. The examiner elected to reopen prosecution and Appellant has elected to reinstate the appeal.

A new Notice of Appeal was filed on February 21, 2007. Accompanying the new Notice of Appeal was an amendment that addressed informalities in the specification and drawings and provided substitute formal drawings.

(v.) Summary of Claimed Subject Matter

Background

Airlines institute selling policies that can change to meet supply and demand considerations to maximize profit on any given flight. When a passenger specifies an itinerary, the itinerary has one or more flight segments. In order to issue a ticket for a single or multi-flight segment itinerary, each flight segment must be available. That is, each flight segment must have seats that have not been already reserved for other passengers. Availability can also be governed by whether an airline will sell to a particular passenger given characteristics of the passenger.

Common characteristics which are used by airlines to decide whether or not to sell a ticket is the price that the passenger is willing to pay for the ticket, whether the passenger is using other flights on that airline, whether the passenger is a frequent flyer and so forth. [Specification page 1, lines 7-20]

Generally, before booking a flight and issuing a ticket, the seller can send a request for availability information to the airline. [Specification page 1, lines 21-23]

Appellant's Invention

Claim 1

One aspect of Appellant's invention is set out in claim 1 as a method executed on a computer system for managing a cache including entries that correspond to seat availability information. "Referring now to FIG. 2, the server process 18 is preferably executed on the server computer 12 but could be executed on the client 32." [Specification page 6, lines 26-29].

The inventive features of claim 1 include proactively determining if a stored answer in the cache is stale, the stored answer corresponding to seat availability information for a seat on a mode of transportation, with determining being based on a criterion for seat availability information, which criterion is determined based on needs of a travel planning system that makes queries to the cache for obtaining the seat availability information. "The cache manager 150 provides additional processing in order to keep the highest quality information in the cache 152 so that the query responses are as useful as possible. The cache manager 150 can operate when availability queries to the cache 152 are not being made or are not pending, or can operate continually ("in the background" or "as a daemon") independent of the availability queries posed to the cache 152. The cache manager 150 implements a management strategy that is dependant on the availability queries being posed to the cache 152.

A travel planning system needs to make availability queries to gather data to complete the travel planning processing. Since availability data is expected to change slowly relative to query rates, and since live availability queries to the airlines can be costly in both time and money, a cache is inserted between the travel planning system and the source of availability data. Furthermore, a cache manager 150 is inserted between the availability cache 152 and the source

20c of availability data, to proactively populate the cache 152 to maintain a high quality level of data in the cache 152 for quick and easy access by the travel planning system 10." [Specification page 12, line 23 to page 13, line 10].

The inventive features of claim 1 address the situation if the stored answer pertaining to seat availability information is stale. "In addition, the answer can include a confidence factor based on whether the query is stale or whether an actual query was performed." [Specification page 11, line 32 to page 12 line 2] sending an availability query to a source of seat availability information for the mode of transportation based on determining that the answer was stale. "The cache manager 150 determines what entries are to be kept in the cache, and submits appropriate "Requests" to the availability source 20c at the appropriate time to obtain the "Responses" that are stored in the cache 152. ... Further, the cache manager 150 might decide that a query should be submitted to the source to gather fresh data about the entry "DL1823 04NOV BOS-LGA 7:30" and either update that entry in the cache or add it if not already present." [Specification page 14, lines 8-19].

Claim 5

Another aspect of the invention is covered by claim 5. Claim 5 is directed to an availability system used for a travel planning system. [Specification page 4, lines 5-9].

Inventive features of Claim 5 include a cache including a plurality of entries of availability information of seats for a mode of transportation. "The availability predictor 65 can be based upon a cache or database of stored availability queries," [Specification page 5, lines 25-26].

Inventive features of Claim 5 also include a cache manager "Referring to FIG. 7, a database manager here implemented as a cache manager 150 to manage a cache 152 is shown." [Specification page 12, lines 3-5] that manages a quality level of entry information in the cache by proactively populating the cache to maintain a high quality level of entries of seat availability information in the cache, with the quality level of the seat availability information in the cache determined by evaluating entries in the cache according to a criterion related to needs of a travel planning system that makes queries to the cache for obtaining seat availability information, and

that sends an availability query to a source of seat availability information for the mode of transportation based on determining that the seat availability information in the cache was stale.

Claim 19

Another aspect of the invention is covered by claim 19. Claim 19 is directed to a computer program product residing on a computer readable medium for managing a cache for predicting availability information for a mode of transportation." This feature is generally supported by the analogous feature of claim 1.

Inventive features of Claim 19 include proactively determining whether a stored answer in the cache is stale, the stored answer corresponding to seat availability information for a seat on the mode of transportation, with instructions to determine being based on a determined criterion for seat availability information, which criterion is determined based on needs of a travel planning system that makes queries to the cache for obtaining the seat availability information. This feature is generally supported by the analogous feature of claim 1.

Inventive features of Claim 19 include updating the stored answer in the cache when the stored answer is stale by sending an availability query to a source of availability information for the mode of transportation. This feature is supported by the analogous feature of claim 1.

Claim 23

Another aspect of the invention is covered by claim 23. Claim 23 is directed to a computer program product residing on a computer readable medium for determining seat availability in a travel planning system. This feature is generally supported by the analogous feature of claim 1.

Inventive features of Claim 23 include instructions to cache entries of seat availability information for a mode of transportation. This feature is generally supported by the analogous feature of claim 1.

Inventive features of Claim 23 also include instructions to manage a quality level of the entries of seat availability information in the cache by evaluating entries in the cache according to a criterion determined based on needs of a travel planning system that makes queries to the

cache for seat availability information, to determine when an entry in the cache should be added, deleted or modified; This feature is generally supported by the analogous feature of claim 1.

Inventive features of Claim 23 also include instructions to delete or modify the entry based on determining that the entry should be deleted or modified. "Referring to FIG. 11A, another manage process 150d for determining what entries are important to add, delete, or update is based on demand. The cache manager 150 monitors and examines the availability queries made to the cache by the travel planning system to determine which flights (or set of flights, such as the flights for a certain day, date, or market) have a high demand for availability information." [Specification page 18, line 31 to page 19, line 5]

Inventive features of Claim 23 also include instructions to proactively populate the cache by sending an availability query to a source of seat availability information for the mode of transportation based on determining whether the entry should be added or modified. "When the cache manager 150 is going to freshen an entry by making a query to the availability source 20c, it selects the entry to freshen as follows:" [Specification page 23, lines 11-14]

Claim 30

Another aspect of the invention is covered by claim 30. Claim 30 is directed to a computer implemented method for managing availability information for a seat on a mode of transportation. This feature is generally supported by the analogous feature of claim 1.

Inventive features of Claim 30 include determining which entries to add, delete, or update in the cache by monitoring and examining availability queries made to the cache by a travel planning system to determine which instances of transportation have a high demand for availability information. This feature is supported by the analogous feature of claim 23.

Inventive features of Claim 30 also include proactively updating entries in the cache if an instance of transportation is determined to have a higher than average or higher than expected demand. "Referring to FIG. 11A, another manage process 150d for determining what entries are important to add, delete, or update is based on demand. The cache manager 150 monitors and examines the availability queries made to the cache by the travel planning system to determine which flights (or set of flights, such as the flights for a certain day, date, or market) have a high demand for availability information. If a flight is determined to have a higher than average or

higher than expected demand, then it might be added to the cache earlier than it would have been otherwise, or it might be updated more often to make sure the information is fresh." [Specification page 18, line 31 to page 19, line 13].

(vi.) Grounds of Rejection to be Reviewed on Appeal

(1) Claims 1-18 and 30-32 stand rejected under 35 U.S.C. 101 as directed to non-statutory subject matter.

(2) Claims 3-4 stand rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement.

(3) Claims 1, 5, 19 and 23 stand rejected under 35 U.S.C. 102(e) as being anticipated by Lynch et al. (US 6,839,679 B1), hereinafter "Lynch."

(4) Claims 23 and 30 stand rejected under 35 U.S.C. 102(e) as being anticipated by Walker et al. (US 2005/0177402 A1), hereinafter "Walker."

(5) Claims 1-3, 5-21, and 23-32 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Mehovic (US 6,122,642 A) (hereinafter Mehovic) and in view of Filepp et al. (US 2003101 67307 A1) (hereinafter Filepp).

(6) Claims 4 and 22 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Mehovic and Filepp, and Khosravi-Sichani (US 5,983,217 A), hereinafter "Khosravi".

(vii.) Argument

Anticipation

"It is well settled that anticipation under 35 U.S.C. §102 requires the presence in a single reference of all of the elements of a claimed invention." *Ex parte Chopra*, 229 U.S.P.Q. 230, 231 (BPA&I 1985) and cases cited.

"Anticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim." *Connell v. Sears, Roebuck & Co.*, 220 U.S.P.Q. 193, 198 (Fed. Cir. 1983).

"This court has repeatedly stated that the defense of lack of novelty (i.e., 'anticipation') can only be established by a single prior art reference which discloses each and every element of

the claimed invention." *Structural Rubber Prod. Co. v. Park Rubber Co.*, 223 U.S.P.Q. 1264, 1270 (Fed. Cir. 1984), citing five prior Federal Circuit decisions since 1983 including *Connell*.

In a later analogous case the Court of Appeals for the Federal Circuit again applied this rule in reversing a denial of a motion for judgment n.o.v. after a jury finding that claims were anticipated. *Jamesbury Corp. v. Litton Industrial Prod., Inc.*, 225 U.S.P.Q. 253 (Fed. Cir. 1985).

After quoting from *Connell*, "Anticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim," 225 U.S.P.Q. at 256, the court observed that the patentee accomplished a constant tight contact in a ball valve by a lip on the seal or ring which interferes with the placement of the ball. The lip protruded into the area where the ball will be placed and was thus deflected after the ball was assembled into the valve. Because of this constant pressure, the patented valve was described as providing a particularly good seal when regulating a low pressure stream. The court quoted with approval from a 1967 Court of Claims decision adopting the opinion of then Commissioner and later Judge Donald E. Lane:

> [T]he term "engaging the ball" recited in claims 7 and 8 means that the lip contacts the ball with sufficient force to provide a fluid tight seal **** The Saunders flange or lip only sealingly engages the ball 1 on the upstream side when the fluid pressure forces the lip against the ball and never sealingly engages the ball on the downstream side because there is no fluid pressure there to force the lip against the ball. The Saunders sealing ring provides a compression type of seal which depends upon the ball pressing into the material of the ring. *** The seal of Saunders depends primarily on the contact between the ball and the body of the sealing ring, and the flange or lip sealingly contacts the ball on the upstream side when the fluid pressure increases. 225 U.S.P.Q. at 258.

Relying on *Jamesbury*, the ITC said, "Anticipation requires looking at a reference, and comparing the disclosure of the reference with the claims of the patent in suit. A claimed device is anticipated if a single prior art reference discloses all the elements of the claimed invention as arranged in the claim." *In re Certain Floppy Disk Drives and Components Thereof*, 227 U.S.P.Q. 982, 985 (U.S. ITC 1985).

Obviousness

"It is well established that the burden is on the PTO to establish a prima facie showing of obviousness. *In re Fritsch*, 972 F.2d. 1260, 23 U.S.P.Q.2d 1780 (C.C.P.A., 1972)."

"It is well established that there must be some logical reason apparent from the evidence or record to justify combination or modification of references. *In re Regal*, 526 F.2d 1399 188, U.S.P.Q.2d 136 (C.C.P.A. 1975). In addition, even if all of the elements of claims are disclosed in various prior art references, the claimed invention taken as a whole cannot be said to be obvious without some reason given in the prior art why one of ordinary skill in the art would have been prompted to combine the teachings of the references to arrive at the claimed invention. Id. Even if the cited references show the various elements suggested by the Examiner in order to support a conclusion that it would have been obvious to combine the cited references, the references must either expressly or impliedly suggest the claimed combination or the Examiner must present a convincing line of reasoning as to why one skilled in the art would have found the claimed invention obvious in light of the teachings of the references. *Ex Parte Clapp*, 227 U.S.P.Q.2d 972, 973 (Board. Pat. App. & Inf. 985)."

"The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification." *In re Gordon*, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984).

> Although the Commissioner suggests that [the structure in the primary prior art reference] could readily be modified to form the [claimed] structure, "[t]he mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification." *In re Laskowski*, 10 U.S.P.Q. 2d 1397, 1398 (Fed. Cir. 1989).

"The claimed invention must be considered as a whole, and the question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination." *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick*, 221 U.S.P.Q. 481, 488 (Fed. Cir. 1984).

> Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under Section 103, teachings of references can be combined only if there is some suggestion or incentive to do so. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984) (emphasis in original, footnotes omitted).

"The critical inquiry is whether 'there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination.'" *Fromson v. Advance Offset Plate, Inc.*, 225 U.S.P.Q. 26, 31 (Fed. Cir. 1985).

(1) Claims 1-18, 30-32 are directed to statutory subject matter within the meaning of 35 U.S.C. 101.

Claims 1-18, 30-32 are proper under 35 U.S.C. 101 because the claimed invention is directed to statutory subject matter. The examiner contends that:

> **Claims 1-18 and 30-32 are directed to abstract idea which does not result in a practical application with provide useful, concrete and tangible result.**
> **Claims 5-18 recite a system. However, the claims lack the necessary physical articles or objects to constitute a machine or a manufacture within the meaning of 35 USC 101. They are clearly not a series of steps or acts to be a process nor are they a combination of chemical compounds to be a composition of matter. As such, they fail to fall within a statutory category. They are, at best, functional descriptive material per se.**

Appellant contends that this rejection is without merit. Appellant's claim 1 calls for: "A method executed on a computer system for managing a cache including entries that correspond to seat availability information.

Claim 1 is limited to a computer implemented method. Claim 1 therefore cannot be directed to an abstract idea, since it is implemented on a machine, i.e., a computer. Rather, claim 1 calls for a computer implemented method that includes proactively determining if a stored answer in the cache is stale… and if the stored answer pertaining to seat availability information is stale, sending an availability query to a source of seat availability information for the mode of

transportation based on determining that the answer was stale. The novel steps recited in claim 1 operate on a cache, a concrete feature commonly found in computer systems.

Claim 1 produces a useful, concrete and tangible result, namely management of a cache of seat availability information. In addition, claim 1 produces another useful, concrete and tangible result, namely sending a query to a souce of seat availability information.

Thus, consistent with the *State Street Bank*[1], holding that: "the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation because it produces 'a useful, concrete and tangible result" -- a final share price," so to does applicant's claim 1 claim a practical application; namely sending an availability query to a source of seat availability information for the mode of transportation based on determining that the answer was stale.

Therefore, the Examiner's conclusion that claim 1 is directed to non-statutory subject matter is in error. Moreover, the examiner neither provides reasoning nor authority to support the conclusion that the claim is directed to an "abstract idea." The examiner does not explain how a computer implemented method is directed to an abstract idea. Moreover the examiner's conclusion is unsupported by the current weight of authority and is completely at odds with the guidance expressed by the Federal Circuit in *In re Warmerdam*, 33 F.3d 1354, 31 U.S.P.Q.2d 1754 (Fed. Cir. 1994), and *AT&T Corp v. Excel Communications, Inc.* et al, 72 F.3d 1352, 50 U.S.P.Q.2d 1447 (Fed. Cir. 1999).

In *Warmerdam*, the court found claims 1-4 and 6 were directed to a process that simply manipulated "abstract ideas" or "natural phenomena. In contrast, claim 5 was found statutory. Claims 1 and 5 are reproduced below:

> 1. A method for generating a data structure which represents the shape of [sic] physical object in a position and/or motion control machine as a hierarchy of bubbles, comprising the steps of:
> first locating the medial axis of the object and
> then creating a hierarchy of bubbles on the medial axis.

[1] State Street Bank & Trust Co. v. Signature Fin. Group, Inc., 149 F.3d 1368, 1374-75, 47 USPQ2d 1596, 1602 (Fed.Cir.1998), cert. denied, 525 U.S. 1093, 119 S.Ct. 851, 142 L.Ed.2d 704 (1999).

> 5. A machine having a memory which contains data representing a bubble hierarchy generated by the method of any of Claims 1 through 4.

In *Warmerdam*, the court held that claims 1-4 and 6 were directed to non-statutory subject matter, whereas claim 5 was clearly directed to statutory subject matter, even though it depended on claims 1-4, because it was directed to a machine. *Warmerdam*, 33 F.3d at 1360.

The reasoning from *AT&T v. Excel* at 1453 while acknowledging that: "A mathematical formula alone, sometimes referred to as a mathematical algorithm, viewed in the abstract, is considered unpatentable subject matter. (citations omitted)" The court also noted that

> This court recently pointed out that any step-by-step process, be it electronic, chemical, or mechanical, involves an "algorithm" in the broad sense of the term. *See State Street Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 1374-75, 47 USPQ2d 1596, 1602 (Fed.Cir.1998), *cert. denied*, 525 U.S. 1093, 119 S.Ct. 851, 142 L.Ed.2d 704 (1999). Because § 101 includes processes as a category of patentable subject matter, the judicially-defined proscription against patenting of a "mathematical algorithm," to the extent such a proscription still exists, is narrowly limited to mathematical algorithms in the abstract. *See id.*; *see also Benson*, 409 U.S. at 65, 93 S.Ct. 253 (describing a mathematical algorithm as a "procedure for solving a given type of mathematical problem").

The court went on to observe that:

> Since the process of manipulation of numbers is a fundamental part of computer technology, we have had to reexamine the rules that govern the patentability of such technology. The sea-changes in both law and technology stand as a testament to the ability of law to adapt to new and innovative concepts, while remaining true to basic principles.

Applicant contends that the Federal Circuit in *AT&T* found the two decisions in harmony, stating: "Finally, the decision in *In re Warmerdam*, 33 F.3d 1354, 31 USPQ2d 1754 (Fed.Cir.1994) is not to the contrary."

In accord with the reasoning in *Warmerdam* is *In re Lowry*, 32 F.3d 1579, 32 USPQ2d 1031 (Fed. Cir. 1994) in which memory storing a data structure was expressly found to recite patentable subject matter by the Board of Patent Appeals & Interferences and acknowledged by the Federal Circuit in rendering its holding that a printed matter rejection did not apply to data structures, as claimed in Lowry.

Claim 5 recites an availability system used for a travel planning system. Claim 5 recites the physical features of "a cache including a plurality of entries of availability information ..." and "a cache manager ...." The examiner argues that claim 5 is non-statutory because the claim does not recite "the necessary physical articles or objects to constitute a machine or a manufacture within the meaning of 35 USC 101." Claim 5 is statutory because it is directed to a system, a physical article, and includes two additional physical articles, a cache and a cache manager. Thus, claim 5 does recite the necessary physical articles to constitute a machine or manufacture within the meaning of 35 USC 101. In claim 5, the cache manager decides how to perform queries based on the needs of the travel planning system, associated with the system and performs physical functions, namely to send queries to a source of seat availability information.

Appellant contends therefore that the claims are proper under 35 U.S.C. §101.

(2) Claims 3-4 are enabled under 35 U.S.C. 112, first paragraph.

The examiner also rejected Claims 3-4 under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. Regarding claim 3, the examiner stated:

> **"The method of claim 1 wherein determining if stored answer is stale comprise: scheduling a list of keys... submitting a query... storing the result in the cache..." However, as shown in Figs. 6, 8A, the scheduling, submitting and storing steps are not part of the determining step. These steps are the steps to be performed after the determining step. Similar rationale is also applied to claim 4.**

Claim 3 limits the method of claim 1, and specifically provides features for the step of determining if the stored answer is stale. The examiner argues that the steps are performed after the determining step, relying on FIGS. 6 and 8A.

Specifically the features of this claim are disclosed in FIG. 8A, where Appellant states: "Referring to FIG. 8[A], one cache manager 150 is a list-based schedule for additions/updates, where one or more lists 158 of keys of entries to update or add are generated externally and given to the cache manager 150. ..."

The steps in claim 3 are directed to how the cache is updated, which Appellant can consider for the purposes of claim 3 and 4, as part of determining if the stored answer is stale. Alternatively those steps could be considered separate from determining as in certain of Appellant's other claims. Appellant's specification does not impose any specific requirement on an order in which these steps would be performed and it is improper for the examiner under the guise of an enablement rejection to impose what the examiner believes that the order should be.

Therefore, claim 3 and by analogy claim 4 are described and enabled within the meaning of 35 U.S.C. 112, first paragraph, since Appellant describes these as one way to implement the cache manager that performs the function of determining.

(3) Claims 1, 5, 19, 23 are not anticipated by Lynch et al.

Claim 1

Claim 1 is directed to a method executed on a computer system for managing a cache including entries that correspond to seat availability information.

Specifically, Claim 1 is directed to a methodology of updating a cache that holds answers to seat availability queries. Conventionally, a travel planning system makes seat availability queries directly to an airline's revenue mangement system (as explained by Appellant[2] and by the Walker reference applied by the examiner below). However, this approach poses problems for travel planning systems, especially those that conduct low fare searches that return many possible answers, because this approach to determine seat availability for an itinerary incurs a monetary cost and a cost in delay in returning answers.[3]

[2] Appellant's specification page 2.
[3] Id.

Specifically claim 1 is distinguished over Lynch since Lynch neither describes nor suggests: " ... proactively determining if a stored answer in the cache is stale, ...based on a criterion for seat availability information, which criterion is determined based on needs of a travel planning system that makes queries to the cache for obtaining the seat availability information and ... sending an availability query to a source of seat availability information for the mode of transportation based on determining that the answer was stale.

The examiner contends that:

> **As per claim 1, Lynch teaches a method for managing a cache including entries that correspond to seat availability information (Col. 3 lines 33-40) comprises:**
> **• "proactively determining if a stored answer in the cache is stale" at Col. 5 line 59 to Col. 6 line 14 and Fig. 3;**
> **• "the stored answer corresponding to seat availability information for a seat on a mode of transportation" at Col. 3 line 64 to Col. 4 line 14 and Fig. 1, element 18;**
> **• "with determined based on the needs of a travel planning system that makes queries to the cache for obtaining the seat availability information" at Col. 5 lines 59 to Col. 6 line 14;**
> **• "and if the stored answer pertaining to seat availability information is stale, sending an availability to a source of seat availability information for the mode of transportation based on determining that the answer was stale" at Col. 6 lines 15-35.**

Claim 1 is neither described nor suggested by Lynch, since Lynch fails to describe or suggest at least ...proactively determining if a stored answer ... is stale, the stored answer corresponding to seat availability information ... with determining being based on a criterion for seat availability information ...determined based on needs of a travel planning system that makes queries to the cache ... and if ...stale, sending an availability query to a source of seat availability information ... .

The examiner contends that Lynch teaches the feature of managing a cache at Col. 3, lines 33-40). Appellant disagrees. Rather, at the cited passage, Lynch describes updating of inventory information:

> **Decision engine module 16 preferably includes two sub-modules or subroutines. The first sub-module of decision engine module 16, which can be described as an inventory update sub-module, preferably functions to direct system 10 to periodically access and retrieve inventory information from one or more computer reservation systems 24 used by the travel agency. The inventory update sub-module further functions to store the inventory information in database 14.**

However Lynch provides a very specific definition of "inventory information," at Col. 3, line 64 to col. 4, line 14, which does not appear to include seat availability information. Specifically, Lynch describes:

> Inventory data structure 18 includes inventory information obtained from one or more computer reservation systems 24 used by the travel agency. The customer reservation systems 24 provide travel service inventory information, such as airline flight, hotel, and rental automobile availability and rates. For airline flights, the inventory information may specify, for example, all flights between each particular city of departure and city of destination (otherwise known as a "city pair"), the airline carriers providing such flights, a description of each flight as either direct or non-direct, the breakdown of all non-direct flights into separate legs or "segments," the identification of each segment of a flight as either domestic or international, the fare classes available on the flights, and pricing information (e.g., one-way ticketing, round-trip ticketing, city-to-city ticketing, or end-to-end ticketing) that can be used to determine the rates of various flights

Appellant contends that the so called "inventory information" disclosed by Lynch is flight, fare and fare rule information and not "seat availability" information. Therefore, Lynch fails to disclose a cache including entries that correspond to seat availability information.

In any event, whether or not Lynch can be view as referring to seat availability information, Lynch does not suggest the claimed cache management scheme, nor indeed any cache that a travel planning system can query to obtain the seat availability information. The examiner contends that Lynch teaches "proactively determining" at Col. 5, line 59 to Col. 6, line 14 and Fig. 3. These passages are reproduced below:

> FIG. 3 is a flow diagram that illustrates a method 100 by which automated travel pricing system 10 periodically obtains information from one or more computer reservation systems 24 and stores the obtained information into database 14. Preferably, method 100 is automatically performed by system 10 without receiving an input from a system user, such as a travel agent.
>
> At block 102, method 100 is initiated. More specifically, system 10 initiates the inventory update sub-module of decision engine module 16, which controls system 10 throughout the performance of method 100.
>
> At block 104, system 10 determines whether a predetermined time has elapsed since inventory information was last obtained from computer reservation systems 24. Preferably, the predetermined time can be set by a user of the system according to the user's needs. For example, a travel agency which desires to have the most current inventory information available can instruct system 10 to access the computer reservation systems twice every hour. On the other hand, a travel agency that wishes to maintain a low hits-to-bookings ratio for each computer reservation system can instruct system 10 to access the computer reservation systems twice each day.

Lynch teaches to update the cache inventory information based on a lapse of a pre-determined time that is established according to a travel agency's desired "hits-to-bookings ratio." The cache management algorithm taught by Lynch is not based on the needs of a travel planning system, nor is the cache management system directed to the update of seat availability information. Rather, Lynch teaches:

> **The data read from the computer reservation systems 24 includes inventory information, such as, for example, all flights between each city pair, airline carriers providing the flights, fare classes available on the flights, a description of each flight as either direct or non-direct, the breakdown of all non-direct flights into separate segments, and the identification of each segment of a flight as either domestic or international. [4]**

At no point does Lynch describe to query an airline's RMS for seat availability information, where such information would in fact be found.

The examiner specifically relies on Col. 3, line 64 to Col. 4, line 14 and Fig. 1, element 18 for the feature of "the stored answer corresponding to seat availability information for a seat on a mode of transportation."[5] Appellant contends that this is not disclosed in Lynch at that passage or elsewhere in Lynch.

Element 18, in FIG. 1 is an inventory data structure. However, as already explained, Lynch does not describe this data structure as holding "seat availability" information.

The examiner argues that the feature "based on the needs of a travel planning system that makes queries to the cache for obtaining the seat availability information" is disclosed at Col. 5, line 59 to Col. 6, line 14. However, this deals with a fixed time period that is set based on "hits-to-bookings ratio," not the needs of a travel planning system that makes queries to the cache for seat availability information, as discussed above.

The examiner contends that the feature of: "if the stored answer pertaining to seat availability information is stale, sending an availability query to a source of seat availability information for the mode of transportation based on determining that the answer was stale" is disclosed at Col. 6, lines 15-35. Again, as set out above, this feature is not disclosed at the cited

---

[4] Lynch Col. 6, lines 24-31.
[5] Examiner's Action page 5.

passage, but instead what is disclosed at the cited passage is that the travel agency reads inventory information from the computer reservation systems. However, it is neither described nor suggested by Lynch that an availability query is sent to a source of seat availability information based on determining that the answer was stale.

Claim 5

Claim 5 is distinct over Lynch, since Lynch does not describe or suggest, an availability system ... a cache including a plurality of entries of availability information of seats for a mode of transportation and a cache manager that manages a quality level ... by proactively populating the cache ... with the quality level of the seat availability information in the cache determined by evaluating entries in the cache according to a criterion related to needs of a travel planning system that makes queries to the cache for obtaining seat availability information, and that sends an availability query to a source of seat availability information ... based on determining that the seat availability information in the cache was stale.

Lynch does not specifically describe or suggest seat availability information, and in particular, does not describe or suggest a cache management scheme of: "proactively populating the cache ... by evaluating entries in the cache according to a criterion related to needs of a travel planning system that makes queries to the cache for obtaining seat availability information, and that sends an availability query to a source of seat availability information."

With respect to this feature the examiner argues that: "with the quality level of the seat availability information in the cache determined by evaluating entries in the cache according to a criterion related to needs of a travel planning system that makes query to the cache for obtaining seat availability information" at Col. 5, line 59 to Col. 6, line 14."[6] Appellant disagrees. Lynch does not teach to populate a cache by evaluating entries in the cache according to a criterion related to needs of a travel planning system that makes queries to the cache for obtaining seat availability information, but instead updates so called inventory information, not "seat availability" information, at fixed time periods, which are set based on a desired "hits-to-bookings ratio." However these teachings neither describe nor suggest the feature of "a travel

[6] Id. page 6.

planning system that makes queries to the cache for obtaining seat availability information," as in claim 5.

Claim 19

Claim 19 is directed to a computer program product ... for managing a cache for predicting availability information for a mode of transportation, and includes instructions to proactively determine whether a stored answer ... is stale, the stored answer corresponding to seat availability information ... with instructions to determine ... based on a determined criterion for seat availability information ... determined based on needs of a travel planning system that makes queries to the cache for obtaining the seat availability information, and update the stored answer ... by sending an availability query to a source of availability information ... .

In addition to the reasons given in claim 4, claim 19 calls for managing a cache for predicting availability information for a mode of transportation. Prediction of availability information is not described or suggested in Lynch.

Claim 23

Claim 23 serves to further distinguish over Lynch, since Lynch neither describes nor suggests to cache entries of seat availability information and instructions to manage a quality level of the entries of seat availability information in the cache, for reasons discussed above.

In addition, claim 23 calls for evaluating entries in the cache according to a criterion determined based on needs of a travel planning system that makes queries to the cache for seat availability information to determine when an entry in the cache should be added, deleted or modified. Lynch, in contrast, discloses:

> **If the predetermined time has elapsed, at block 106, system 10, under the control of the inventory update sub-module, reads data from one or more computer reservation systems 24. If system 10 is connected to more than one computer reservation system 24, data can be read from each computer reservation system sequentially so that only one computer reservation system 24 is accessed at any given moment. Alternatively, system 10 can be configured to read data from a plurality of computer reservation systems simultaneously. The data read from the computer reservation systems 24 includes inventory information, such as, for example, all flights between each city pair, airline carriers providing the flights, fare classes available on the flights, a description of each flight as either direct or non-direct, the breakdown of all non-direct flights into separate segments, and the identification of each segment of a flight as either domestic or international.**

Lynch neither describes nor suggests to: "evaluate entries in the cache according to a criterion" and determine when an entry in the cache should be added, deleted or modified. Rather, Lynch merely performs a wholesale update of entries. Lynch does not describe any evaluation of the entries, but rather relies on "whether a predetermined time has elapsed since inventory information was last obtained from computer reservation systems. Preferably, the predetermined time can be set by a user of the system according to the user's needs."[7]

Accordingly, Lynch cannot disclose instructions to: evaluate entries in the cache since Lynch merely determines if a time from the last update has elapsed. Thus, Lynch also does not disclose to "delete or modify the entry based on determining that the entry should be deleted or modified and proactively populate the cache by sending an availability query to a source of seat availability information for the mode of transportation based on determining the entry should be added or modified, since Lynch does not in a specific sense "delete or modify the entry based on determining that the entry should be deleted or modified."

(4) Claims 23 and 30 are not anticipated by Walker.

Claim 23

Claim 23 is directed to a computer program product ... for determining seat availability in a travel planning system. The examiner contends that:

> **As per claim 23, Walker teaches a computer program product comprising:**
> **• "cache entries of seat availability information for a mode of transportation" at [0048]**
> **• "manage a quality level of the entries of seat availability information in the cache by evaluating entries in the cache according to a criterion determined based on needs of a travel planning system that makes queries to the cache for seat availability information, to determined when an entry in the cache should be added, deleted or modified" at [0078]-[0082] and Fig. 13;**
> **• "delete or modify the entry based on determining that the entry should be deleted or modified" at [0081]-[0082];**
> **• "proactively populate the cache by sending an availability query to a source of seat availability information for the mode of transportation based on determining the entry should be added or modified" at [0076].**

[7] Lynch, Col. 6, Lines 3-7

Claim 23 distinguishes over Walker, since Walker neither describes nor suggests ... instructions to "manage a quality level of the entries ... in the cache by evaluating entries in the cache according to a criterion determined based on needs of a travel planning system that makes queries to the cache for seat availability information, to determine when an entry in the cache should be added, deleted or modified." Walker also neither describes nor suggests instructions to: "delete or modify the entry based on determining that the entry should be deleted or modified and instructions to proactively populate the cache by sending an availability query to a source of seat availability information ... based on determining the entry should be added or modified."

The examiner contends that the instructions to "manage a quality level" are found in Walker [0078]-[0082] and Fig. 13. Appellant disagrees. Walker discloses: "[0078] FIGS. 13a and 13b are flow charts illustrating an exemplary process by which an airline's RMS dynamically increases or decreases the allocation of inventory to a special fare listing." However, the RMS system, as disclosed by Walker, is not describing management of a cache of entries, but rather is describing how an airline's availability system allocates inventory, specifically in Walker to a "special fare listing."

In paragraphs [0079] - [0081] Walker discusses how the RMS handles inventory allocated to the "special fare listing" that Walker proposes to add to the RMS. Nowhere in this discussion however does Walker describe nor suggest ... "instructions to manage a quality level of the entries ... in the cache by evaluating entries in the cache according to a criterion determined based on needs of a travel planning system that makes queries to the cache for seat availability information, to determine when an entry in the cache should be added, deleted or modified."

Walker does not describe any mechanism to manage a cache of availability answers nor provide a structure that can be used to access these answers in response to a query for seat availability information. Rather, Walker describes changes to be made to existing RMS systems to accommodate a special fare listing.

Walker also neither describes nor suggests the feature of instructions to delete or modify the entry based on determining that the entry should be deleted or modified, whether at [0081]-[0082] or elsewhere. Walker also does not describe or suggest the feature of instructions to

"proactively populate the cache by sending an availability query to a source of seat availability information for the mode of transportation based on determining the entry should be added or modified" whether at [0076] or elsewhere.

Rather, Walker describes operation of a Revenue Management System (RMS) that Walker seeks to modify to provide for a special fare listing. This so called RMS system is the source of seat availability answers. As explained by Walker, "In step 1210, the RMS 200 also transmits the inventory and faro/class information to the ARS 150."[8] Thus, since Walker describes the RMS, and the RMS is the only source of seat availability disclosed by Walker, Walker cannot be reasonably construed that the RMS system sends an availability query to itself.

On the other hand, Walker also discloses that: "In step 1215, the ARS 150 stores the information locally and then transmits it to the CRS 300, directly, or via the ATP Co. 115. In step 1220, the CRS 300 also stores the allocated inventory and fare/class in the seat allocation database 245 and pricing and restrictions database 250, respectively."[9] However, Walker does not describe any of the claimed management for the storage at the ARS 150 or the CRS 300 or ATP Co. 115.[10]

Claim 30

Claim 30 is directed to a computer implemented method for managing availability information . . . . Claim 30 includes the features of determining which entries to add, delete, or update in a cache by monitoring and examining availability queries made to the cache by a travel

---

[8] Walker [0076]

[9] Id.

[10] Walker does mention CRS database management. However, the CRS database management mentioned by Walker deals with modifications to the record for the special fare listing in the seat allocation database 245.

> [0086] In step 1440, the CRS 300 stores the reservation in the reservation database 255. In step 1445, the CRS 300 modifies the record for the special fare listing in the seat allocation database 245 by decrementing the "Remaining Inventory" by "1" and incrementing the "Total Inventory Booked" by "1". In step 1446, the CRS 300 receives the actual flight information from RMS 200, including a flight number and departure time, in real-time (e.g., minutes or even seconds after booking the unspecified-time ticket in step 1435) and displays it for the travel agent 110. In step 1448, the CRS 300 accesses the seat allocation database 245 and modifies the record for the actual flight by incrementing the "Total Inventory Booked" by "1" and decrementing the "Total Seats Remaining" by "1". The CRS 300 also modifies the record for the special fare listing by decrementing the "Total Inventory Booked" by "1". In step 1450, the traveler 105 purchases the unspecified-time ticket and is immediately notified by the travel agent 110 of the actual flight information, including a flight number and departure time. In step 1455, the traveler receives an airline ticket for the actual flight.

planning system to determine which instances of transportation have a high demand for availability information and proactively updating entries in the cache if an instance of transportation is determined to have a higher than average or higher than expected demand.

Walker does not describe determining which entries to add, delete, or update in a cache for reasons discussed above. Additionally, Walker does not describe that the determining is done "by monitoring and examining availability queries made to the cache by a travel planning system to determine which instances of transportation have a high demand for availability information."

The examiner relies again on [0078] to [0082] and Figs. 13a-b of Walker. In addition to the reasons discussed above, nowhere does Walker teach: "monitoring and examining availability queries made to the cache by a travel planning system."

The examiner also relies on Walker [0078] to [0082] to teach: "proactively updating entries in the cache if an instance of transportation is determined to have a higher than average or higher than expected demand." As discussed above, Walker does not teach this feature.

Additionally, the examiner relies on [0037] of Walker. Walker at [0037] discloses:

> **[0037] For the actual flights, the RMS 200 will monitor the actual demand within each fare class relative to the forecasted demand to dynamically reevaluate the inventory allocated to both the actual flights and the special fare listing. In accordance with the present invention, if the actual demand is less than the expected demand, the RMS 200 will allocate additional inventory to the special fare listing at a lower fare/class than the currently available fare/class on the actual flights. Conversely, if the actual demand is greater than the expected demand, the RMS 200 will reduce or eliminate inventory for the special fare listing. In either case, the RMS 200 transmits inventory and pricing information for the special fare listing to the ARS 150 in the same manner as for the actual flights.**

However, the RMS, as already discussed above, is not the cache and Walker does not disclose to update entries in the cache, rather Walker changes allocations of inventory by the RMS.

(5) Claims 1-3, 5-21, 23-32 are patentable over Mehovic and Filepp.

Claims 1 and 19

For the purpose of this appeal only, claims 1 and 19 stand or fall together. Claim 1 is representative of this group of claims.

Claim 1 is directed to a method executed on a computer system for managing a cache including entries that correspond to seat availability information. Claim 1 includes the feature of proactively determining if a stored answer in the cache is stale, the stored answer corresponding to seat availability information for a seat on a mode of transportation, with determining being based on a criterion for seat availability information, which criterion is determined based on needs of a travel planning system that makes queries to the cache for obtaining the seat availability information ... .

The examiner takes the position that Mehovic substantially teaches the claimed invention including an airline computerized reservation system ("CRS") to provide flight and seat availability information (Col. 2 lines 5-20), cache (Fig. 4, element 20) that stores data propagated from the CRS 12 in response to queries from a client 26 (Col. 3 lines 54-58). The examiner also contends that Mehovic teaches a different cache management algorithm. According to the examiner: "Mehovic synchronizes the cache 20 with the CRS by propagating data immediately after CRS 12 updates the data or at definable intervals of time (Col. 3 lines 59-65), and therefore does not teach proactively update the cache based on frequency of access to the cache as claimed."

The examiner relies on Filepp to teach this feature. According to the examiner:

> **... However, Filepp teaches an airline reservation system (page 4, [0052]) utilizing caches storage (Fig. 2, 302) wherein the objects in caches are proactively updated based on frequency of access to the objects in the caches (page 50, [0821]-[0823]). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine Filepp's cache management algorithm with Mehovic's CRS system so that "only the latest version of the object will be provided to guarantee currency of information to the user" as noted by Filepp at page 50, [0821]. By factoring the frequency of updating of updating of the objects in order to determine whether cached objects are current, Mehovic's system would detect the flights with high frequency of access, which implies that the number of available seats are also changed more frequently, and update the flight data so that**

the availability information for that flight is updated and current, therefore prevent overbooking or assigning the same seat to multiple passengers.

Appellant contends that the examiner misconstrues Appellant's claim 1. Claim 1 is directed to a methodology of updating a cache that holds answers to seat availability queries. As discussed above, conventionally, a travel planning system makes seat availability queries directly to an airline's revenue mangement system (as explained by Appellant[11] and by the Walker reference applied by the examiner above). However, this approach poses problems for travel planning systems, especially those that conduct low fare searches that return many possible answers, because this approach to determine seat availability for an itinerary incurs a monetary cost and a cost in delay in returning answers.[12]

Appellant contends that Mehovic fails to disclose that the CRS includes a revenue management system or the like.[13] Mehovic never disclosed to migrate seat availability information to the RDBMS. Appellant contends that one skilled in this art would consider illogical to migrate the seat availability information in Mehovic, since Mehovic is directed to a fundamentally different problem than that of Appellant. Mehovic teaches: "to automate the migration of data structures from an airline TPF based CRS processing environment and, in particular, the American Airlines' SABRE TPF based CRS environment to a relational database management system (RDBMS) for transparent retrieval and use by the end user." Mehovic is thus directed to migration of computerized reservation data, not data that is used to find a set of flights, fares and whether or not that set of flights and fare will result in an available seat on an airline. In Mehovic, that process was completed since it deals with reservation data (passenger name records or PNR's).[14]

---

[11] Appellant's specification page 2.
[12] Id.
[13] As disclosed in Walker (discussed above) the CRS can receive availability data from an RMS system. However, Mehovic does not describe to migrate seat availability information.
[14] Mehovic describes: By way of example, the present invention for a system for propagating TPF based CRS data to a relational database platform and enabling the execution of relational database applications using the TPF based CRS data is now described in reference to the propagation, function management and use by an end-user of an American Airlines' SABRE CRS Passenger Name Record ("PNR").

In the examiner's Response to Arguments, the examiner states that: "Applicant argued that 'Mehovic does not teach any of the features of claim 1'." Particularly, Mehovic does not teach "provid[ing] flight and seat availability information"."

Appellant does not disagree with the general proposition that seat availability data predates Appellant's invention. However, nowhere was the examiner able to show that "seat availability information" was migrated in Mehovic to the RDBMS. Rather, Appellant has shown that migration of seat availability data is not disclosed in Mehovic nor would migration of the seat availability data serve any purpose in Mehovic.

Mehovic is directed to a migration tool for what is essentially reservation information, e.g., PNR's (passenger name records) the industry standard database representation for a passenger's trip that includes flight, booking-code, fare and payment information, as well as passenger names and contact information. However, PNR's are the result of booking a ticket after, e.g., searching for flights and fares that satisfy a travel query and determining that seats on flights in a solution to the travel query will be made available to the querier. The PNR is not used in the flight/fare search process but rather is used after that process has executed to store reservation information after a solution is booked, e.g., a ticket issued. Because Mehovic is directed to migration of transaction data from CRS systems to the RDBMS, it would not make any sense to migrate seat availability information, because that seat availability information is not used after booking but before and is evaluated prior to forming the transaction data that is migrated. Therefore, migrating "seat availability information" would serve no purpose when migrating transaction data, e.g., PNR's, as taught by Mehovic.

Appellant contends that the feature of a cache including entries that correspond to seat availability information, is not disclosed or suggested by Mehovic. Indeed, Mehovic does not even mention seat availability information. Rather, Appellant contends that the examiner improperly relies on an inherency argument that "a cache including entries that correspond to seat availability information" is inherent[15] in Mehovic. Appellant contends that any argument

[15] Mehovic teaches a method for migrating data from the SABRE computerized reservation system to a relational database management system (i.e., a cache) for retrieval and used by the end user. The SABRE system is well known in the art and has been used by travel agents since 1960s to retrieve flight information, seat availability and booking information. All basic features of the SABRE system should be inherent to a skill in the art and need not be

that relies on inherency in the context of an obviousness rejection is improper. "The concept of inherency is not applicable to the question of obviousness." *In re Sporman*, 363 F.2d 444, 150 USPQ 449 (CCPA 1965). To refer to an unexpected property or parameter as inherent begs the question of whether the unexpected property rebuts prima facie obviousness. In addition, there is no basis upon which the examiner can reasonably argue that Mehovic inherently would migrate seat availability data. Therefore, the examiner has not shown that Mehovic teaches: "a cache including entries that correspond to seat availability information," as recited in claim 1.

The examiner recognized at least one of the deficiencies in Mehovic's teachings as applied to Appellant's claims. The examiner notes that Mehovic uses a different cache management algorithm. However, the examiner improperly characterizes this feature of Appellant's claim 1, when the examiner states that Filepp teaches: "proactively update the cache based on frequency of access to the cache as claimed." Claim 1 does not recite update based on frequency of access. Rather, claim 1 recites: "proactively determining if a stored answer in the cache is stale, the stored answer corresponding to seat availability information ... with determining ... based on a criterion for seat availability information, which criterion is determined based on needs of a travel planning system that makes queries to the cache ... ."

The Combination of Mehovic with Filepp Is Not Suggested

Assuming *arguendo* that Filepp teaches the cache management scheme, recited in claim 1, Applicant contends that there is no motivation to modify Mehovic to apply Filepp's cache management scheme. The examiner urges that the motivation is: "so that 'only the latest version of the object will be provided to guarantee currency of information to the user,' as noted by Filepp at page 50, [0821]."

Appellant contends that this motivation is illogical when viewed with Mehovic's system. Indeed, if the desired outcome was to ensure that only the latest version of information in the TPF system of Mehovic was migrated to the RDBMS system of Mehovic, what better way to satisfy that desire than by migrating the data when the data in the TPF system changes, as

---

explicitly recited. Therefore, it is unreasonable to state that the SABRE system does not provide flight and seat availability information, as argued by applicants. Mehovic teaches the detail of information stored in the relational database, which includes: Reservation, Segment, Passenger and ticket at Col. 6 lines 40-67 et seq. [Examiner's Action of Nov. 29, 2005, Response to Arguments Pages 6-7]

Mehovic has already taught, since it is the TPF system and not the RDBMS system that knows when updates are available. Accordingly there is absolutely no basis upon which to so modify Mehovic.

However, the examiner argues that: "By factoring the frequency of updating of the objects in order to determine whether cached objects are current, Mehovic's system would detect the fights with high frequency of access, which implies that the number of available seats are also changed more frequently, and update the flight data so that the availability information for that flight is updated and current … ." Appellant contends that this motivation is illogical when applied to Mehovic, because Mehovic is dealing with a migration tool, where the frequency of changes in the TPF system are not based on current needs of the RDBMS system or the clients attached to the system, but instead at the rate that the TPF system changes data.

It would be illogical to update on the basis of either Mehovic client's needs or Mehovic's RDBMS, since the TPF migrates to the RDBMS all of the data structures that are in the TPF system and it is the TPF that knows when data has changed. Thus, the logical way to update the RDBMS is the way that Mehovic describes: "as changes occur in the TPF" or "on a defined basis… using a log in the TPF to save changes," (of course at the cost that the RDBMS would occasionally have incomplete data). There is no need in Mehovic for any cache management technique that updates proactively, as in claim 1, because the TPF already updates the RDBMS and the update could not be accomplished any faster than disclosed by Mehovic were Mehovic to be modified by Filepp to provide for a proactive update. Rather, proactively would appear to make unnecessary update requests slowing down both systems, since it could be argued that were Mehovic to adopt a proactive scheme, it would ask for updates when none in fact were available, thus wasting valuable computing resources.

It is well established that: "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious." *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). In the instant case, the proposed modification of Mehovic with Filepp provides an update scheme that changes the manner in which Mehovic would migrate data. Indeed, the modification is less desirable than that disclosed

in the primary reference. Therefore, Mehovic combined with Filepp is a proposed combination that destroys the intent, purpose and principal of operation of Mehovic, the primary reference, and thus is not suggested.

Filepp Does Not Teach the Update Mechanism that the Examiner Relies on

Notwithstanding the lack of motivation to combine Mehovic with Filepp, neither the examiner's motivation nor the teachings of the proposed combination is directed to the claimed feature of: "proactively determining if a stored answer in the cache is stale, the stored answer corresponding to seat availability information ... with determining ... based on a criterion for seat availability information, which criterion is determined based on needs of a travel planning system that makes queries to the cache ... ."

The examiner characterizes Appellant's cache update mechanism as: "proactively update the cache based on frequency of access to the cache as claimed." This is incorrect. Rather, the cache is updated based on needs of the system that makes the queries to the cache for the information in the cache, e.g., the travel planning system. Thus, as those needs change, the cache is proactively updated with availability data deemed necessary for the travel planning system.

However, Filepp does not teach the cache update mechanism that the examiner relies on. That is, Filepp fails to teach "wherein the objects in caches are proactively updated based on frequency of access to the objects in the caches (page 50, [0821]-[0823])." as the examiner urges. Rather, Filepp discloses in paragraphs [0821]-[0823]:

> **[0821] When objects are requested from object storage facility 439, only the latest version of the object will be provided to guarantee currency of information to the user. Object storage facility 439 assures currency by requesting version verification from network 10 for those objects which are available locally and by requesting objects which are not locally available from delivery system 20 where currency is maintained.**
>
> **[0822] Version verification increases response time. Therefore, not all objects locally available are version checked each time they are requested. Typically, objects are checked only the first time they are requested during a user session. However, there are occasions, as for example in the case of objects relating to news applications, where currency is always checked to assure integrity of the information.**
>
> **[0823] The frequency with which the currency of objects is checked depends on factors such as the frequency of updating of the objects. For example, objects that are designated as ultrastable in a storage control parameter in the**

header of the object are never version checked unless a special version control object sent to the RS as part of logon indicates that all such objects must be version checked. Object storage facility 439 marks all object entries with such a stability category in all directories indicating that they must be version checked the next time they are requested.

Neither the object verification discussed in [0821]-0822] (in which as objects are requested from object storage facility 439 the latest version is provided to guarantee currency of information to the user) nor frequency with which the currency of objects is checked, as disclosed in [0823], suggests either the claimed feature of: "determining being based on a criterion for seat availability information, which criterion is determined based on needs of a travel planning system that makes queries to the cache for obtaining the seat availability information" or the examiner's characterization of that feature: "wherein the objects in caches are proactively updated based on frequency of access to the objects in the caches (page 50, [0821]-[0823])."

Filepp's object storage facility 439 assures currency by requesting version verification from network 10 for those objects which are available locally and by requesting objects that are not locally available from delivery system 20 where the current version is maintained. However, these teachings have no relevance to the claimed feature of claim 1. Rather, version verification as taught by Filepp teaches away from the claimed feature of claim 1, because in Filepp each time an object is requested, verification of the version is requested, whereas claim 1 is directed to proactively determining if a stored answer in the cache is stale ... and sending an availability query ... based on determining that the answer was stale. Therefore, Filepp does not teach this feature of proactively determining.

Filepp at [0823] also discusses that: "The frequency with which the currency of objects is checked depends on factors such as the frequency of updating of the objects." However, this teaching also is not relevant to the claimed feature, since the objects are updated based on their designation, e.g., ultrastable objects are "never version checked unless a special version control object sent to the RS as part of logon indicates that all such objects must be version checked."; or "Object storage facility 439 marks all object entries with such a stability category in all directories indicating that they must be version checked the next time they are requested."

Accordingly, any combination of the cache management algorithm taught by Filepp, or the cache management algorithm the examiner says was taught by Filepp, with Mehovic's teachings, still fails to provide the features of claim 1 or even the examiner's mischaracterization of the features of claim 1.

In the examiner's Response to Arguments the examiner argues that: "Applicant … does not explain what the criterion is and how they are different." Appellant responds that criteria are found in Appellant's specification (See for example page 16) and are the subject of certain of Appellant's dependent claims. However, the examiner has not furnished any prior art that would require Appellant to limit the claims to any particular set of criteria.

Accordingly, claim 1 is neither described nor suggested by Mehovic as modified by Filepp.

Claims 2, 20, 30 and 31

For the purpose of this appeal only claims 2, 20, 30 and 31 stand or fall together. Claim 2 is representative of this group of claims.

Claim 2 further limits claim 1 and calls for … monitoring availability queries made to the cache by a travel planning system to determine which flights, sets of flights, the flights for a certain day, date, or market have a high demand for availability information. The examiner contends that:

> **As per claim 2, Mehovic and Filepp teach the method of claim 1 as discussed above. Filepp also teaches: "monitoring availability queries made to the cache by a travel planning system to determine which flights, sets of flights, the flights for a certain day, date, or market have a high demand for availability information" at pages 50-51, [0821]-[0827].**

Appellant contends that no combination of Mehovic with Filepp suggests this feature of claim 2. Appellant contends that Filepp does not suggest the claimed feature whether in paragraphs 821-827 or elsewhere.

Claim 2 requires monitoring availability queries made to the cache by a travel planning system in order to determine which flights, sets of flights, the flights for a certain day, date, or market have a high demand for availability information. Filepp does not teach any aspect of the

travel planning features of this claim or the aspect of monitoring queries made by another system to the cache in order to forecast which data in the cache to check for possible updating. Filepp teaches to version test cacheable objects and, if the object is not present, to fetch the object. No aspect of Filepp, however, teaches to monitor queries made to the cache and to determine demand for that information from what is being requested for the purpose of determining if the stored answer is stale.

In rejection of claim 1, (discussed above) the examiner contended that:

> **... By factoring the frequency of updating of updating of the objects in order to determine whether cached ' objects are current. Mehovic's system would detect the flights with high frequency of access, which implies that the number of available seats are also changed more frequently, and update the flight data so that the availability information for that flight is updated and current, therefore prevent overbooking or assigning the same seat to multiple passengers.**[16]

The examiner reasons that one can detect and update flight data in the system disclosed by Mehovic. This is incorrect. Recall that Mehovic is directed to a system to migrate PNR's. PNR's are reservation records, not flight and fare data that are searched and combined to provide travel solutions and booking of tickets that result in the formation of PNR's. Moreover, there is absolutely no teaching in Mehovic or Filepp that would suggest monitoring of queries made to the cache, or of monitoring of queries made to the cache to determine which flights, sets of flights, the flights for a certain day, date, or market have a high demand for availability information.

Claims 3 and 21

For the purposes of this appeal only, claims 3 and 21 may be treated as standing or falling together. Claim 3 is representative of these claims.

Claim 3 recites that determining if the stored answer is stale includes scheduling a list of keys where the list of keys are identifiers of specific instances of transportation to update or add, and for each key ..., submitting a query to the availability source and storing the result in the cache, by updating an entry if present and adding an entry if not present in the cache.

---

[16] Examiner's action page 13

The examiner contends that:

> **As per claim 3, Mehovic and Filepp teach the method of claim 1 as discussed above. Mehovic also teaches: "scheduling a list of keys where the list of keys are identifiers of specific instances of transportation to update or add, and for each key on the list in the order given, submitting a query to the availability source; and storing the result in the cache, by updating an entry if present and adding an entry if not present in the cache." at Col. 6 line 40 to Col. 7 line 15.**

Claim 3 is allowable over the combination of references since no combination of these references suggests the recited scheduling. The examiner relies on Mehovic to teach this feature, and specifically uses Mehovic's teaching of the PNR (Passenger Name Record). A PNR is a structure used in the airline industry to track a specific reservation and ticket brought by a customer. No aspect of the PNR is used as or suggests a scheduling mechanism that updates or adds entries in the cache. Moreover, no aspect of the PNR is used in submitting a query to the availability source.

Claims 5, 7-11, 23-26

For the purposes of this appeal only, claims 5, 7-11, 23-26 may be treated as standing or falling together. Claim 5 is representative of these claims.

Claim 5 is directed to an availability system used for a travel planning system. The availability system includes a cache including a plurality of entries of availability information of seats for a mode of transportation and a cache manager. The cache manager manages a quality level of entry information in the cache by proactively populating the cache ... with the quality level of the seat availability information in the cache determined by evaluating entries in the cache according to a criterion related to needs of a travel planning system that makes queries to the cache for obtaining seat availability information, and that sends an availability query to a source of seat availability information for the mode of transportation based on determining that the seat availability information in the cache was stale.

Appellant notes that the examiner has not sought to reject this claim under 35 U.S.C. 112, second paragraph, as being indefinite because the claim recites: "high quality levels," nor has the examiner explicitly ignored limitations in these claims. Rather the examiner bases the rejection of these claims solely on the examiner's misinterpretation of the prior art.

Mehovic taken together with Filepp fails to disclose all of the features of claim 5. As Appellant has already argued, the combination of these references is not suggested. Assuming *arguendo* that the references are combinable, Appellant contends that no combination of Mehovic with Filepp suggests an availability system use for a travel planning system. The base reference, Mehovic, does not specifically teach the travel planning system. That is, the base reference is directed to a reservation system. Moreover, the base reference does not even address any aspect of seat availability or the problems with using seat availability information by travel planning systems.

The examiner uses the same basis, as in claim 1, to reject this claim, namely, ... that "Mehovic substantially teaches the claimed invention ... .", but that Mehovic uses "a different cache management algorithm." and Filepp teaches "an airline reservation system (page 4, [0052]) utilizing caches storage (Fig. 2, 302) wherein the objects in caches are proactively updated based on frequency of access to the objects in the caches (page 50, [0821]-[0823])."

As was argued in claim 1, Mehovic never described that the CRS included a revenue management system, or the like, and never described migrating of seat availability information. Appellant notes that it is not logical to assume that Mehovic does migrate seat availability information, since Mehovic is directed to a fundamentally different problem than that of Appellant. Mehovic teaches "to automate the migration of data structures from an airline TPF based CRS processing environment and, in particular, the American Airlines' SABRE TPF based CRS environment to a relational database management system (RDBMS) for transparent retrieval and use by the end user."

Appellant contends that the features the examiner relies on, namely a cache including entries that correspond to seat availability information, are not taught by Mehovic. Rather, Appellant contends that the examiner improperly relies on an inherency argument and that a cache including entries that correspond to seat availability information" is not inherent[17] in Mehovic. Accordingly there is no basis upon which to infer that Mehovic migrates seat availability data.

[17] *In re Spormon*, 363 F.2d 444, 150 U.S.P.Q. 449 (C.C.P.A. 1965). (discussed above)

Notwithstanding the lack of motivation to combine, neither the examiner's motivation nor the proposed combination is directed to the claimed features, as discussed for claim 1. Claim 5 also recites that: " ... a cache manager that manages a quality level of entry information ... by proactively populating the cache to maintain a high quality level of entries of seat availability information ... , with the quality level of the seat availability information in the cache determined by evaluating entries in the cache according to a criterion related to needs of a travel planning system that makes queries to the cache for obtaining seat availability information. The cache manager also "sends an availability query to a source of seat availability information ... based on determining that the seat availability information in the cache was stale ... ."

The examiner characterizes Appellant's cache update mechanism as "proactively update the cache based on frequency of access to the cache as claimed." This is incorrect. Rather, the cache is updated based on "evaluating entries in the cache according to a criterion related to needs of a travel planning system that makes queries to the cache for obtaining seat availability information." Thus, as those needs change, for whatever reason, the cache is proactively updated with availability data deemed necessary for the travel planning system.

In addition, Filepp does not teach the characterization of the cache update mechanism that the examiner relies on, as discussed above regarding Filepp's disclosure in paragraphs [0821]-[0823] of version testing. Rather, Appellant's cache manager determines whether an entry is stale by determining what the needs are of the travel planning system, the system that is the consumer of the data in the cache. Thus, unlike Filepp where the object storage facility 439 can assure currency by requesting version verification from network 10, in claim 5 the cache manager determines what the needs of the consuming system, e.g., travel planning system are and based on those needs proactively updates entries in the cache. Therefore, no combination of Filepp and Mehovic suggests the features of claim 5.

Claim 6

Claim 6 limits the availability system of claim 5 and recites that the cache manager determines when an entry should be added to the cache. According to the examiner, Mehovic teaches:

As per claim 6, Mehovic and Filepp teach the system of claim 5 as discussed above. Filepp also teaches the cache manager determines when an entry should be added to the cache at [0826].

Paragraph [0826] of Filepp discloses so called "Cacheable objects." According to Filepp, a cacheable object can be retained during a current user session, but cannot be retained between sessions. According to Filepp, the object storage facility 439 retains objects in the cache according to the LRU storage retention algorithm. Accordingly to Filepp, the "Object storage facility 439 uses the LRU algorithm to ensure that objects that are least frequently used forfeit their storage to objects that are more frequently used." Teaching of a LRU algorithm only governs whether or not the object will be retained in the cache and not whether an entry should be added to the cache.

Claims 12 and 27

For the purposes of this appeal only, claims 12 and 27 may be treated as standing or falling together. Claim 12 is representative of these claims.

Claim 12 further limits claim 10 and recites that entries to be added, modified, or deleted are determined from the distribution or nature of availability queries posed to the cache.

The examiner contends that: "As per claim 12, Mehovic and Filepp teach the system of claim 10 as discussed above. Filepp also teaches entries to be added, modified, or delete are determined from a distribution or nature of availability queries poses to the cache at [0826]-[0827]."

Claim 12 is distinct over the combination of Mehovic and Filepp. Filepp teaches at [0826] a session basis for retention of cacheable objects, namely that cacheable objects are retained during a current user session but cannot be retained between sessions. Moreover, at [0827], Filepp teaches "Trashable objects" that are retained in on a context basis of a partitioned application in which the object was requested. According to Filepp "Trashable objects" usually have a very high update frequency and must not be retained to ensure that the user has access to the most current data.

Claim 12 requires that: "entries to be added, modified, or deleted are determined from the distribution or nature of availability queries posed to the cache." Filepp fails to teach any

mechanism by which the distribution or nature of availability queries posed to the cache determines entries to be added, modified, or deleted. Rather, Filepp teaches that cacheable objects can be retained during the current user session, but cannot be retained between sessions and are retained according to the least recently used retention algorithm (LRU) and trashable objects, those that are updated at a very high frequency must not be retained. None of these teachings, however, suggest the claimed feature.

An example can be used to show how these teachings of Mehovic and Filepp have no relevance to the claims. At page 19, lines 1-9 Appellant describes:

> The cache manager 150 monitors and examines the availability queries made to the cache by the travel planning system to determine which flights (or set of flights, such as the flights for a certain day, date, or market) have a high demand for availability information. If a flight is determined to have a higher than average or higher than expected demand, then it might be added to the cache earlier than it would have been otherwise, or it might be updated more often to make sure the information is fresh.

Thus, whereas, Appellant's system would tend to update these entries more frequently, Filepp would teach to avoid storing them in the cache in the first instance, viewing them as a "trashable object," as the examiner seems to imply. Of course, were such a cache management scheme actually employed in Appellant's invention, such a scheme would work against the very point of the invention to keep the entries fresh and to keep in the cache those entries that are most likely needed by the travel planning system.

Claims 13-16 and 28-29

With respect to claims 13-16 and 28-29, which deal with aspects of prediction and modeling, the examiner fails to show what purpose would be served by adding a predictor (as allegedly taught by Filepp) to the system taught by Mehovic. Mehovic is directed to a migration tool that migrates PNR's and other transaction records to a RDBMS system. Recalling that the PNR's are structures used to store reservation information, the examiner has failed to show that any purpose would be served by modifying Mehovic to include a predictor. Indeed, Appellant

contends that no purpose would be served by the purported combination. Therefore, because the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, the teachings of the references are not sufficient to render the claims prima facie obvious. *In re Ratti*, 270 F.2d 810, supra. Here the examiner has failed to show any basis for the purported combination and clearly the purported combination would indeed change the principle of operation of the prior art invention and therefore is, per se, not suggested.

Claims 13 and 28

For the purposes of this appeal only, claims 13 and 28 may be treated as standing or falling together. Claim 13 is representative of these claims.

Claim 13 recites that entries to be added, modified, or deleted are determined by using a predictor or model of the availability queries which are likely to be posed or are likely to be useful in the future. The examiner contends that:

> **As per claim 13, Mehovic and Filepp teach the system of claim 10 as discussed above. Filepp also teaches entries to be added, modified, or deleted are determined by using a predictor or model of the availability queries which are likely to be posed or are likely to be useful in the future at [0826]-[0830].**

The examiner fails to show where Filepp teaches at [0826]-[0830] or elsewhere to use a predictor to model which availability queries are likely to be posed, in order to determine which entries to add, update or delete. Rather, Filepp merely teaches "Cacheable objects" [0826], "Trashable objects," [0827] and in [0828]-[0830] locating as many information and transactional support objects which the user is likely to request, as close to the user as possible. However, none of these teachings suggest the claim feature, because none of the teachings involve any aspect of modeling or prediction or use of a predictor. Rather, Filepp clearly describes that these located transactional objects are "objects required to support a desired application ... ." Even at [0830] where Filepp teaches "to optimize the effectiveness of the limited storage space at RS 400, the collection of objects is restricted to those likely to be requested by the user; i.e., tailored to the user's tastes--and to those least likely to be time sensitive; i.e., objects which are stable." does not involve any aspect of prediction, since that is already determined based on the desired

application and, in any event, does not teach "by using a predictor or model of the availability queries which are likely to be posed or are likely to be useful in the future."

Claims 14 and 29

For the purposes of this appeal only, claims 14 and 29 may be treated as standing or falling together. Claim 14 is representative of these claims.

Claim 14 limits claim 13 and recites that the predictor or model is based on a deterministic, probabilistic, or statistical classifier or predictor, databases or cache of historical data or previously predicted information, simulations of various availability systems and actual availability data sources.

The examiner contends that: "As per claim 14, Mehovic and Filepp teach the system of claim 13 as discussed above. Filepp also teaches the predictor or model is based on a deterministic, probabilistic, or statistical classifier or predictor, databases or cache of historical data or previously predicted information, simulations of various availability systems and actually availability data sources at [0826]-[0830]."

Filepp does not teach any predictor, much less a deterministic, probabilistic, or statistical classifier or predictor, databases or cache of historical data or previously predicted information, simulations of various availability systems and actual availability data sources as the basis for the predictor or the model.

Claim 15

Claim 15 recites that entries to be added, modified, or deleted are determined by comparing actual answers or cached answers to predictions made by a predictor or model of the availability information. As with claims 13 and 14, the combination of Mehovic with Filepp fails to teach this feature at [0826]-[0830] of Filepp or elsewhere.

Claim 16

Claim 16 recites that the predictor used to guide the cache manager operation predicts the rate of change or time of change of the seat availability. Neither Mehovic nor Filepp teach seat availability information, nor does Filepp teach a predictor. Therefore Filepp cannot teach to use

a predictor to guide the cache manager operation by predicting the rate of change or time of change seat availability information whether at [0826]-[0830] or elsewhere.

Claim 17

Claim 17 recites that entries to be added, modified, or deleted are determined by prior knowledge, such as busy travel days, important or busy markets, or busy travel times. The examiner contends that: "As per claim 17, Mehovic and Filepp teach the system of claim 10 as discussed above. Filepp also teaches entries to be added, modified, or deleted are determined by prior knowledge at [0826]-[0830]." The examiner fails to show where Filepp teaches at [0826]-[0830] or elsewhere to add, update or delete based on prior knowledge of busy travel days, important or busy markets, or busy travel times. Rather, Filepp merely teaches "Cacheable objects" [0826], "Trashable objects," [0827] and in [0828]- [0830] information and transactional support objects. As disclosed by Filepp, none of these teachings involve any aspect of modeling or prediction or use of a predictor, bur rather are "objects required to support a desired application … ." Even at [0830] where Filepp teaches the collection of objects is restricted to those likely to be requested by the user; i.e., tailored to the user's tastes--and to those least likely to be time sensitive; i.e., objects which are stable, they are still the objects required by the application not based on any prior knowledge, such as busy travel days, important or busy markets, or busy travel times.

Claim 18

Claim 18 recites that entries to be modified or deleted are determined by the date of travel for the seat in comparison to the current date. The examiner also uses the same argument for rejection of this claim as was used in claim 17. Again, Mehovic taken with Filepp fails to teach to update entries based on a date of travel for a seat in comparison to the current date.

Claim 32

Claim 32 limits claim 30 and includes observing and parsing queries made to the cache by a travel planning system; and updating a list of entries queried along with a frequency count tallying the number of times each entry has been accessed and based on frequency of access

determining whether the entry should be added or deleted from the cache, whether priority should be raised or lowered to freshen the data for that entry from the availability source more or less often.

The combination of Mehovic with Filepp does not suggest any aspect of observing and parsing queries made to the cache ... and updating a list of entries queried along with a frequency count tallying the number of times each entry has been accessed and based on frequency of access determining whether the entry should be added or deleted from the cache, whether priority should be raised or lowered to freshen the data for that entry from the availability source more or less often.

While this feature of the claim is probably closest to the examiner's prior characterizations of Appellant's cache update mechanism, as discussed above, the combination of Mehovic and Filepp is not suggested and the combination fails to suggest the cache mechanism, as characterized by the examiner.

(6) Claims 4 and 22 are patentable over Mehovic, Filepp, and Khosravi-Sichani.

Claims 4 and 22

For the purposes of this appeal only, claims 4 and 22 stand or fall together. Claim 4 is representative of this group of claims.

Claim 4 further limits claim 1 and recites wherein determining if the stored answer is stale includes scheduling multiple lists, by processing one entry from each list by a round-robin polling through the lists in turn until one entry has been processed from each list, returning to the first list to process the next entry, generating an entry for each entry on the list in the order given, by submitting a query to the availability source and storing the result in the cache, by updating an entry if present and adding an entry if not present in the cache.

Appellant contends that the main references Mehovic and Filepp fail to suggest the basic features of claim 4, and that inclusion of Khosravi fails to cure that deficiency.

Conclusion

Appellant submits, therefore, that Claims 1-32 are allowable over the cited art. Therefore, the Examiner erred in rejecting Appellant's claims and should be reversed.

Respectfully submitted,

Date: 4/2/10

Denis G. Maloney
Reg. No. 29,670

Fish & Richardson P.C.
225 Franklin Street
Boston, MA 02110-2804
Telephone: (617) 542-5070
Facsimile: (617) 542-8906

Appendix of Claims

1. A method executed on a computer system for managing a cache including entries that correspond to seat availability information, the method comprises:

proactively determining if a stored answer in the cache is stale, the stored answer corresponding to seat availability information for a seat on a mode of transportation, with determining being based on a criterion for seat availability information, which criterion is determined based on needs of a travel planning system that makes queries to the cache for obtaining the seat availability information; and if the stored answer pertaining to seat availability information is stale,

sending an availability query to a source of seat availability information for the mode of transportation based on determining that the answer was stale.

2. The method of claim 1 wherein the mode of transportation is air and determining if the stored answer is stale further comprises:

monitoring availability queries made to the cache by a travel planning system to determine which flights, sets of flights, the flights for a certain day, date, or market have a high demand for availability information.

3. The method of claim 1 wherein determining if the stored answer is stale comprises:

scheduling a list of keys where the list of keys are identifiers of specific instances of transportation to update or add, and for each key on the list in the order given,

submitting a query to the availability source; and

storing the result in the cache, by updating an entry if present and adding an entry if not present in the cache.

4. The method of claim 1 wherein determining if the stored answer is stale comprises:

scheduling multiple lists, by processing one entry from each list by a round-robin polling through the lists in turn until one entry has been processed from each list;

returning to the first list to process the next entry;

generating an entry for each entry on the list in the order given, by

submitting a query to the availability source; and

storing the result in the cache, by updating an entry if present and adding an entry if not present in the cache.

5. An availability system used for a travel planning system comprises:

a cache including a plurality of entries of availability information of seats for a mode of transportation; and

a cache manager that manages a quality level of entry information in the cache by proactively populating the cache to maintain a high quality level of entries of seat availability information in the cache, with the quality level of the seat availability information in the cache determined by evaluating entries in the cache according to a criterion related to needs of a travel planning system that makes queries to the cache for obtaining seat availability information, and that sends an availability query to a source of seat availability information for the mode of transportation based on determining that the seat availability information in the cache was stale.

6. The availability system of claim 5 wherein the cache manager determines when an entry should be added to the cache.

7. The availability system of claim 5 wherein the cache manager determines when an entry should be deleted from the cache.

8. The availability system of claim 5 wherein the cache manager determines when an entry already in the cache should be modified.

9. The availability system of claim 5 wherein entries to be added, modified, or deleted are obtained by asynchronous notification from external systems.

10. The availability system of claim 9 wherein entries to be added, modified, or deleted are taken from a list or multiple lists of predetermined entries.

11. The availability system of claim 10 wherein the entries in the list include predetermined orderings or priorities.

12. The availability system of claim 10 wherein entries to be added, modified, or deleted are determined from the distribution or nature of availability queries posed to the cache.

13. The availability system of claim 10 wherein entries to be added, modified, or deleted are determined by using a predictor or model of the availability queries which are likely to be posed or are likely to be useful in the future.

14. The availability system of claim 13 wherein the predictor or model is based on a deterministic, probabilistic, or statistical classifier or predictor, databases or cache of historical data or previously predicted information, simulations of various availability systems and actual availability data sources.

15. The availability system of claim 10 wherein entries to be added, modified, or deleted are determined by comparing actual answers or cached answers to predictions made by a predictor or model of the availability information.

16. The availability system of claim 13 wherein the predictor used to guide the cache manager operation predicts the rate of change or time of change of the seat availability.

17. The availability system of claim 10 wherein entries to be added, modified, or deleted are determined by prior knowledge, such as busy travel days, important or busy markets, or busy travel times.

18. The availability system of claim 10 wherein entries to be modified or deleted are determined by the date of travel for the seat in comparison to the current date.

19. A computer program product residing on a computer readable medium for managing a cache for predicting availability information for a mode of transportation, comprises instructions to cause a computer to:

proactively determine whether a stored answer in the cache is stale, the stored answer corresponding to seat availability information for a seat on the mode of transportation, with instructions to determine being based on a determined criterion for seat availability information, which criterion is determined based on needs of a travel planning system that makes queries to the cache for obtaining the seat availability information; and

update the stored answer in the cache when the stored answer is stale by sending an availability query to a source of availability information for the mode of transportation.

20. The computer program product of claim 19, wherein the mode of transportation is air and the product further comprising instructions to:

monitor availability queries made to the cache by a travel planning system to determine which flights, sets of flights, the flights for a certain day, date, or market have a high demand for availability information.

21. The computer program product of claim 19 further comprising instructions to:

schedule a list of keys where the keys are identifiers of specific instances to update or add and for each entry on the list in the order given,

submit a query to the availability source; and

store the result in the cache, by updating an entry if present and adding an entry if not present in the cache.

22. The computer program product of claim 19 further comprising instructions to:

schedule multiple lists, by processing one entry from each list by a round-robin polling through the lists in turn until one entry has been processed from each list,

return to the first list to process the next entry;

generate an entry for each entry on the list in the order given;

submit a query to the availability source; and

store the result in the cache, by updating an entry if present and adding an entry if not present in the cache.

23. A computer program product residing on a computer readable medium for determining seat availability in a travel planning system, the computer program product comprising instructions to cause a computer to:

cache entries of seat availability information for a mode of transportation; and

manage a quality level of the entries of seat availability information in the cache by evaluating entries in the cache according to a criterion determined based on needs of a travel planning system that makes queries to the cache for seat availability information, to determine when an entry in the cache should be added, deleted or modified;

delete or modify the entry based on determining that the entry should be deleted or modified; and

proactively populate the cache by sending an availability query to a source of seat availability information for the mode of transportation based on determining the entry should be added or modified.

24. The computer program product of claim 23 wherein entries to be added, modified, or deleted are obtained by asynchronous notification from external systems.

25. The computer program product of claim 24 wherein entries to be added, modified, or deleted are taken from a list or multiple lists of predetermined entries.

26. The computer program product of claim 25 wherein the entries in the list include predetermined orderings or priorities.

27. The computer program product of claim 24 wherein entries to be added, modified, or deleted are determined from a distribution or nature of availability queries posed to the cache.

28. The computer program product of claim 24 wherein entries to be added, modified, or deleted are determined by using a predictor or model of availability queries which are likely to be posed or are likely to be useful in the future.

29. The computer program product of claim 28 wherein the predictor or model of availability queries likely to be posed is based on at least one of deterministic, probabilistic, statistical classifier or predictor, databases, cache of historical data or previously predicted simulations of availability systems and actual availability data sources.

30. A computer implemented method for managing availability information for a seat on mode of transportation, comprises:

determining which entries to add, delete, or update in a cache by monitoring and examining availability queries made to the cache by a travel planning system to determine which instances of transportation have a high demand for availability information;

proactively updating entries in the cache if an instance of transportation is determined to have a higher than average or higher than expected demand.

31. The method of claim 30 wherein the mode of transportation is air and the instances of transportation are flights, which include flights, a certain day, date, or market, which

are added to the cache earlier or refreshed more often than the flights would otherwise have been added or refreshed, to make sure the information is fresh.

32. The method of claim 30 further comprising:

observing and parsing queries made to the cache by a travel planning system; and

updating a list of entries queried along with a frequency count tallying the number of times each entry has been accessed; and

based on frequency of access determining whether the entry should be added or deleted from the cache, whether priority should be raised or lowered to freshen the data for that entry from the availability source more or less often.

Evidence Appendix

None

Related Proceedings Appendix

None